

LISTing Newsletter

Newsletter of the Long Island Sinclair/Timex Users Group



September 1993 Issue

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PLUS PROGRAMS, GAMES AND
ASSORTED OTHER TIDBIT.

NEXT MEETING SEPT 12, 1993



From The List Scrapbook
Michael (Mike) Stern
Kids - Corner Reports

8/93
F. Stern
Editor



Listing Policy

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COMING EVENTS:

 SEPT. 12, 1993 LIST MEETING.

 SPECIAL NOTICE

THE NEXT MEETING WILL BE HELD AT
 THE ICE CREAM DISPENSARY
 (HARVEY'S STORE)
 334 DOGWOOD AVENUE
 FRANKLIN SQUARE, N.Y.
 TEL: 516-486-1090

DIRECTIONS: SOUTHERN STATE PKWY
 TO EXIT 17 NORTH (HEMPSTEAD AVE)
 GO TO FIRST TRAFFIC LIGHT,
 LEFT TURN ON TO CORNWALL,
 NEXT TRAFFIC LIGHT, BEAR RIGHT
 ON TO DOGWOOD AVENUE. GO 1 MILE
 TO THE ICE CREAM DISPENSARY, IN
 A SMALL SHOPPING CENTER ON THE
 LEFT SIDE OF THE ROAD.

MEETING MINUTES

 REPORTED BY: FRED STERN
 JUNE 16, 1993

 HARVEY CALLED THE MEETING TO
 ORDER AT 2:15PM.

WE RECEIVED A FEW INFORMATIONAL
 CORRESPONDENCE.

RESPONSE AND PARTICIPATION IN
 OUR SWAPMEET WAS VERY DISAP-
 POINTING. WE HOPE THIS IS NOT A
 SIGN OF THINGS TO COME.

ATTENDING MEMBERS HELD A ROUND-
 TABLE DISCUSSION ON WHAT DIREC-
 TION LIST SHOULD TAKE WITH RE-
 DUCED IN MEMBERSHIP, AND
 DWINDLING SUPPORT FOR TIMEX/
 SINCLAIR.

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THE FOLLOWING PUBLICATIONS ARE
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 COMPUTER
 \$4.00 EACH.

MAX (A NEW MEMBER) HAS A TANDY
 640K COMPUTER WITH COLOR MONITOR
 ALL BOOKS, NEVER USED. \$295.00
 CALL MAX AT 516-486-4236.

A FINAL WORD

 MY NAME IS FRED STERN AND I AM
 THE EDITOR OF THIS EDITION OF
 LISTING.

I HOPE EVERYONE IS HAVING A
 WONDERFUL SUMMER. THE WEATHER
 HAS BEEN GREAT. LET US HOPE THAT
 THIS IS THE BEGINNING OF A
 BETTER YEAR FOR NOT ONLY LIST,
 BUT THE ENTIRE TIMEX/SINCLAIR
 COMMUNITY.

TO BRING A BIT OF NOSTALGIA,
 WE ARE REPRINTING SOME ARTICLES
 FROM OUR FIRST ISSUE OF LISTING
 ORIGINALLY PRINTED IN FEBRUARY
 1984.

SPECIAL THANKS GO TO BOB GILDER,
 TOM SKAPINSKI, JOHN PAZMINO AND
 PAUL DONNELLY FOR THEIR CON-
 TRIBUTIONS.

A VERY SPECIAL THANK YOU TO
 HARVEY FOR HIS HOSPITALITY, AND
 THE USE OF HIS STORE FOR OUR
 MEETING. ALSO TO MIKEY FOR HIS
 CONTRIBUTIONS.

SEE YOU ALL AT THE NEXT MEETING.

TIMEX Sinclair 1000

LONG ISLAND SINCLAIR TIMEX

USERS GROUP

QL CORNER

Great news for QL Users! Psion, UK has declared XCHANGE, a suite of four bundled programs, (Quill, Archive, Abacus and Easel) as public domain software. All QL and QDOS users can freely distribute copies among their groups for personal use. The version of XCHANGE being distributed is 3.90 which was rewritten and produced by Dansoft for the Thor computer (a QL in a PC case).

My understanding is that each of the five programs (Xchange, Quill, Archive, Abacus and Easel) have the latest upgrade which include additional commands.

The Xchange file is approximately 183K, which will only operate with disk systems as the file is too long to be placed on a microdrive cartridge.

Thanks to LIST member, Joe LaPunzina for providing me with a copy of Xchange.

The diskette has many files on it, which includes a disk editor, a file editor, a screen dump utility with many different printer drivers and _doc files.

Xchange provides a multitasking environment, has commands of its own; Set which allows the default data drive and Help file drive to be changed; Output which controls printing a document as a background task while you continue working on either of the four programs. TSL is another command which stands for Task Sequencing Language. Seeing this in action will astound you! There are a series of TSL files on the disk.

My advice is to load Xchange. When the Xchange screen appears, press CTRL/C, then F3, T. A prompt will appear on the command line; enter TUTOR and then press enter. A menu will appear at the top of the screen offering a tutorial for each of the Tasks (Quill, Archive, Abacus and Easel). Press the appropriate letter for the task and Xchange will load and run the tutorial file of your choice.

Quill has several new commands: Glossary which allows the user to designate a character to be used as a 'Macro'. Export, which will output the current file in memory to be printed to a file in ASCII, without any control characters attached (except carriage return). In other versions you could do the same thing when printing to a file instead of printing to a printer. However, when you choose this option the user had to remove the disk with the printer driver on it so as not to have any printer control characters embedded within the file.

There is a Mail Merge facility included within Quill and another command called Extract, which operates much like the copy command but will allow you to save blocks of text to a disk so that they may be merged into other documents.

If I have interested you in the Xchange suite, you can send me a formatted 720K disk (either 5 1/4" or 3 1/2" diskette), with return postage (normally 75 cents for one disk) and enclosed in a decent envelope which can be used for the return mail, I will copy the entire disk for you and mail it back to you. I have a disk with the Xchange HELP files formatted into _doc files which makes life a lot easier when printed out on paper instead of reading the Help files on a screen. If you want these files include an additional formatted 720K disk - the postage for both disks usually runs at 90 cents. See you next month....Bob Gilder

THE KILLER EMULATOR FROM HELL by John Pazmino

By now the supplies and sources for Sinclair hardware are quite dwindling. It is tough to introduce newcomers to Sinclair for the general lack of apparatus to outfit them with. On top of this is the pervasion of the IBM type of computer among the vulgate which works fiercely against adopting Sinclair as a new platform.

What to do? In the UK, where Sinclair still rules in the 8-bit computer world, there were efforts to work a software solution: Turn the IBM into a Sinclair. In principle this is easy because the Z80 CPU architecture has been emulated on the 8088 (and higher) chips thru software. Many readers will remember, and perhaps still have, the CP/M emulators on the early IBM rigs.

However, emulators for the Sinclair have been, well, ech!. Why? Mainly they are written by Sinclair folk who on the whole are unversed in IBM. In deed, some Sinclair emulators are nothing but the Z80 code of the Sinclair ROM shoved into a Z80 CPU emulator. This was for many years not cricket becasue the code was the property of Sinclair and then Amstrad.

There's a physical barrier, too. Except for the very first IBM PC, issuing simulataneoulsy with the Sinclair ZX-81, the IBM has no innate means of receiving input from a cassette. Some emulators simply gave up at this obstacle and work only with type-in programs.

Well, now in this merry year of 1993 comes the Killer Emulator from Hell, a Sinclair emulator for the IBM that does everything a Sinclair emulator should do and does it right. This new emulator, Z80, is a shareware creation from Europe.

Shareware, not lucreware.

This point is crucial. For in early 1993 Amstrad, who holds the rights for the Spectrum and QL, formally threw the code for the ROMs into public use. That is, anyone may now copy and distribute the original ROM code in their own products PROVIDED that these products are noncommercial. Commercial use of the ROM code is still prohibited. Ergo, altho Z80 does have woven into it native Sinclair code it is copasetic and quite kosher.

Z80 dissolves the above -- and many many other -- problems in bringing the Sinclair to the IBM. It comes on an IBM stiffy with 720K of files. They rehydrate to about 2M on your harddisc. Two megabytes! That's, um, more than thirty Spectrumsful! What ARE all these crazy files!? Relax, already. Most of the files are sourcecode and literature. You can shiv them, after printing or copying them off, leaving 'just' 330K of working files. That's STILL about five Spectrumsful of stuff. For emulating a Spectrum?

They toto in uno are a symphony of several Sinclair systems: the Spectrum 48K model, 128K model (with pixel graphics and multichannel sound), Interface 1 (with serial ports), Sinclair and Kempston joysticks, Multiface 1 (with memory capture), tape loading indicator, Z80 dissembler and monitor, header-reader, screen editor, RAMdisc, swappable ROMs, Microdrives, Disciple discs, and (of course!) tapedrive. All of these are provided via software in quite perfect replication of the original hardware gadgets. Thus, the complete inability to attach native Sinclair accessories to the IBM is much overcome by building the most crucial ones right into the emulator.

The emulator receives its original input from cassette only. This requires a cable connecting the IBM parallel port to the cassette deck, with some circuit bits along the way. The emulator has clear instructions for making this cable and it took me an afternoon to build it, including a stopoff on Canal Street to get the parts.

If you in giddy delirium shoved Z80's disc into your IBM without

making the connector, chill out! Z80 comes with seven ready-to-run Spectrum programs. Nothing fancy, some games and utilities.

I can not here elaborate on the very many details of this emulator. That would amount to describing the entire Spectrum world! I here highlight a few major features. This emulator, for starts, in fact does what every Sinclair fan sweats in sleep for: IT BODILY TRANSFERS TAPES TO DISC. Yes, it takes the files from tape and mirrors them on a regular IBM file. And this file to the emulated Spectrum quacks and flies and waddles exactly like the original tape. The major positive(!) difference is that you never 'spot' or 'rewind'. This feature alone virtually eliminates the 'tape loading error' from a tapefile that failed to catch. It'll pass around again in, oh, a millisecond for another go. Each 360K disc holds several, depending on length, cassettes of programs.

With Z80 you may choose between a replica of a cassette OR AN ORDINARY IBM FILE. That is, you may load from EITHER the emulated tape OR from an IBM file that contains the program in DOS form! Hand up? Yes? Sure, Z80 converts the one kind into the other!

You over there? Voce alta, de favore. OK, you have several short tapes or programs and you want to combine them on one cassette. What a magilla on the real Sinclair! Load from one tape; swop tapes; spot it; save to it. Swop for the next tape With Z80 you merely knit together the separate 'tapes' in any order you want and get one consolidated new 'tape'. Yes, that right. Uh, let's continue, please?

These grand goodies so far are alone enough to justify the nuisance of reaching overseas for this emulator. In one weekend you can put your entire Spectrum collection onto disc WITH ABSOLUTELY NO MODIFICATION OF THE ORIGINAL CODE. You 'bung the tape' by specifying the tape's IBM file, do a LOAD and the 'tape' goes ahead and loads.

Please do understand that this is utterly NOT a 'RAMdump', 'memory capture' or 'snapshot'. Z80 does this, too, as an altogether separate function. In the tape mirror each file of the tape is actually in the IBM file and you even use the (included!) header-reader to see them. What's more, the header-reader browses the tape and loads ANY tape file you want. You don't have to let the tape run thru to load the program way off at the tail end. Hmmm, a random-access cassette tape.

The Spectrum keyboard is exactly mapped to the IBM keyboard. You use all the keywords and tokens. Being that the IBM has no Sinclair keytops, you popup a Sinclair keyboard diagram. It's really a rather faithful depiction of the chicklet Spectrum with the corner colorband and all that. There is no such mapping for the Spectrum 128K becuase this model does not use keywords and tokens. You type in everything litteratim with all the regular IBM keys.

Besides the replicated Spectrum keys, the extra IBM keys are energized. You, for instance, get the <=> symbol by <sym<L>> or by just punching the <=> key. Either the IBM <alt> or <ctl> keys stands for the Sinclair <sym> key. I do see a danger in this convenience! Play with the Spectrum-in-IBM for a while. Then go back to the real Spectrum. Where the eff is that <[]> symbol!?

The numberpad is the cursorpad, the Sinclair joystick, or the Kempston joystick -- as you wish by selection. The cursorkeys work, too, for editing the command line. <esc> is the EDIT key, as is <sft<1>>; <bsp> and do DELETE along with <sft<0>>.

The IBM functionkeys are the adit to the emulator's forest of functions, with <F1> being the general 'help' feature and <alt<F1>> popping up the Spectrum keyboard layout.

When you do a screensave ("SAVE <name> SCREEN\$"), THE SCREEN\$ FILE CAN BE SHARED WITH OTHER IBM PROGRAMS. What?! Uh, you see, this emulator converts a Spectrum SCREEN\$ file into a GIF or PCX file! You share textfiles, too, with other IBM programs by a conversion

between Sinclair's CR-only and IBM's CR/LF line terminations. All these conversions use the IBM file as the working medium.

The Microdrives are mimicked on IBM file. There are eight 'microdrives' in the emulator, the maximum capacity of the original Interface, and each 'cartridge' is an IBM file. You 'slot' a microdrive by allocating a file to a drive. Ah!, to use a new cartridge you must 'format' it ("FORMAT "m";3;<name>"; hey!, those extra IBM keys ARE cool!). This creates a new IBM file 137K long with 126K of 'tape'. Two of these fit on a 360K floppy or five on a 720K stiffy. Once you format a emulated cartridge you can work with it exactly as you would a physical cartridge. You even pull a 'catalog' of the file and 'erase' stuff from it!

The Disciple disc is, too, cloned in Z80, altho the United States never enjoyed this system. Again, the IBM file is the working medium. Being that on stateside we deal with many minor disc systems, can Z80 handle, say the Zebra system? Now comes the freako part. The code for the Disciple system is excisable from the primum corpus of the emulator. YOU CAN REPLACE IT WITH THE OPERATIONS OF YOUR PECULIAR DISC SYSTEM. Yes!, you may ultimately junk the hardware of the Zebra system and run everything from the Zebra code you wrote into Z80.

The total supplantation of Sinclair's physical media with IBM files lets you jettison just about every disc and cartridge utility in sight. With your stuff in IBM files you can apply any and all of the IBM file utilities on it. Farewell, Cartridge Doctor! Vale, KopyKat!

Wait a minute!!! What happens to all those luscious Sinclair cartridges and discs in those milkcrates? Since you simply can not feed them to the IBM you must revert to the original tapes. Load the files into Z80 from the tapes and save them onto the emulated disc or cartridge. Without such prime tapes you may have one revolting job before you! You must transfer the disc or cartridge files back to cassettes and then procede as just described.

Communications thru the emulator use the cloned serial ports of the Interface 1. Remember my series a year back on PostScript on the Sinclair? (Yesyesyes, I know, LISTings missed out the fourth and final part.) Now you can actualize this by running Z80 on an IBM fitted with a PostScript printer. But there's a weirder prospect, attainable with Z80: Pass data from the Spectrum to an other IBM program. You in this case do not need a PostScript printer; use your existing printer! You run a PostScript software emulator like Emulaser or GhostScript on the IBM and send Spectrum generated PostScript files to it. Ugh! such disgustingly gorgeous output. From a Spectrum. FROM A SPECTRUM!

Becuse the emulator is European the presumption is that you use the serial port for printing and the instructions detail conversing with a printer thru it. In the US printers are routinely hung from the parallel port and the serial port is the avenue to a modem. Hence, in making the cassette cable, include a 'Y' connector or A-B switch so the printer and cassette can coexist. To accommodate the possibility of a parallel printer, Z80 allows a redirection of output to LPTx.

However, there is a clumsiness in using the printer, one of the [very] few downpoints of Z80. The LPRINT, LLIST, and COPY commands do not fire characters directly to the attached printer. You have to first open a channel to the printer ("OPEN #3,"t") and then send output to that channel. I already wrote, via Internet, to the author about this and suggested that he make LPRINT, LLIST, and COPY send output to a DOS printer driver of the sort included with word processors. If he can work this into a future edition of Z80 you'll be printing to whatever device you got attached to the IBM.

What the deal about other ROMs? You recall that the American flavor of SPECTRUM, the Timex 2000, has a dockport into which an external ROM plugged to override the onboard ROM. Also, when the Zebra

How? There are two methods. The first is to get the ROM code into an IBM file and then point Z80 at it when igniting the emulator. This bypasses the default ROM file. The other is to patch [a copy of] the default ROM file with code for the new ROM and let Z80 go and think it's drinking up the same old code.

By now your throat is dry, your glands are leaking, your hairs are dropping out. TELL ME, UNCLE!, UNCLE!, WHERE IS THIS Z80 THINGIE!! Send off 15 British pounds to B G Services, 64 Roebuck Road, Chessington, Surrey KT9-iJX, England and ask for the Z80 Spectrum emulator for IBM computers. I did this and got my emulator in 12 days flat. To pay from the US I just took my ordinary check and wrote it out for "fifteen British pounds" payable to "B G Services"; it went thru smoothly. Plastic is not [yet?] accepted. B G Services is a Spectrum outlet and it'll enclose a sheet for its other items, too.

[illegible]

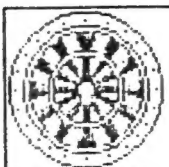
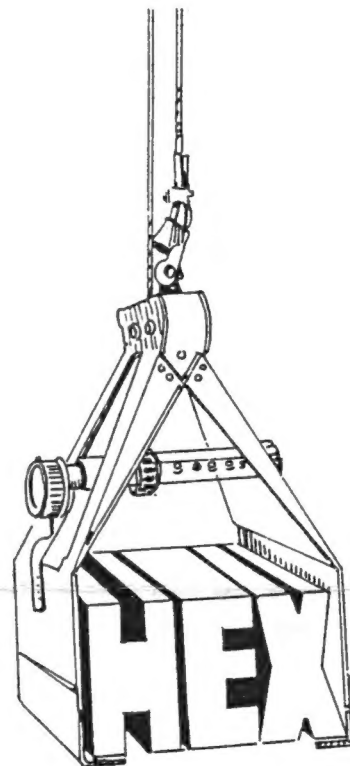
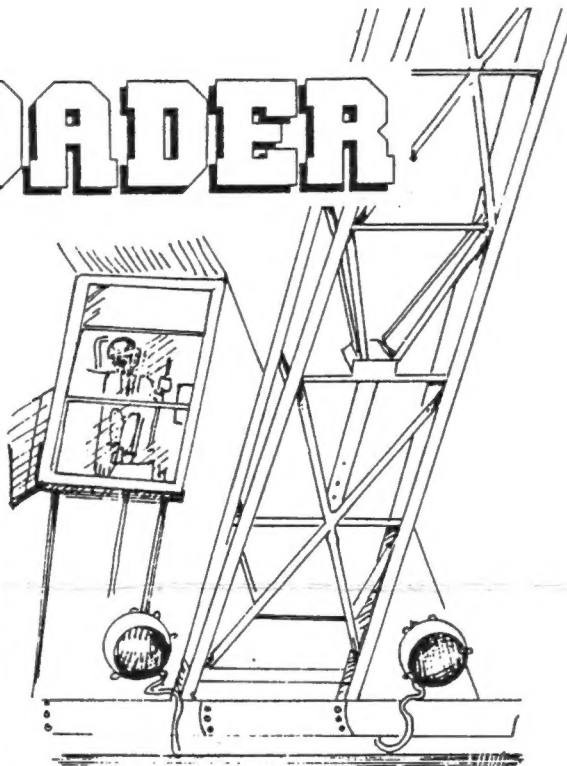
```

1 REMXXXXXXXXXXXXXXXXXXXXXXXXXXXX
10 LET I=16427 15 INPUT AS
20 IF AS="S" THEN STOP
30 PRINT AS: "***";
40 POKE I,16*(CODE(AS)-28)+CODE
(TLS(AS))-28
50 LET I=I+1
60 GOTO 15

```

HEXLOADER works on the ZX-80, which is something of a rarity. The REM in line one must contain more characters than there are bytes in the machine code program. The number code 118 must not be used in machine code routines or all kinds of strange things will start to happen to the listing.

To remove the REM statement from line one, POKE 16403, 10. This program will help many people who still own a ZX-80 to obtain more power from it using machine code. Machine code programming is something which has not been entered into any great depth with the ZX-80.



ON TARGET HINTS & TIPS



11: H\$="HELLO"

```
20 LPRINT MID$(A$,3,2)
30 LPRINT LEFT$(A$,2)
40 LPRINT RIGHT$(A$,2)
```

LL
44
LJ

SINCLAIR BASIC

2)
3 TO 4)
(LEN = -1 - 0)

Copyright 1984
P.J. Donnelly

Marty J., has been entering some Microsoft BASIC programs into his 2068. He offers the following sample correlation for STRING handling.

MICROSOFT	RESULTS	SINCLAIR BASIC
MIDS(AS,3,2,)	LL	AS(J to 4)
LEFTS(AS,2)	HE	AS(EO 2)
RIGHTS(AS,2)	LO	AS(LEN(AS)-1 To)

- 2 -

HARDWARE REVIEW

ITEM: 1510 COMMAND CARTRIDGE PLAYER
USE: INSTANT LOAD SOFTWARE
FOR: 8K ROM/16K RAM
FROM: TIMEX CORP.
WATERBURY, CONN. 06725
PRICE: \$19.95 + P&H (\$2.50)

The prices of the promised software for the 1510 are only slightly higher than their tape counterparts, so spending \$20 for the convenience of instant loading seems a small price to pay. Of course, as usual, it's been over two months since I ordered software and while I received the player quickly, my cartridge arrived only yesterday. What can you do with just the player, I thought? First, let's have a look at the hardware.

The TS 1510 is a small (3" square by 2 1/2" high) silver plastic box, color matched to the 2068 (on which it probably will not work). A female edge connector mates to the back of your TS or other peripherals and an expansion bus extends out the rear for your 16K RAM. 36 contact cartridges are inserted from the top into another slotted card edge connector. The unit needs no auxiliary power service, and you must have 16K to use it with a cartridge.

Under the hood of the 1510 is a double-sided Printed Circuit Board with plated through holes (DPT). Components include chip-select logic consisting of a 74LS02, quad NOR, 74LS00, quad NAND, some despiking and filter capacitors, and a simple pull up resistor and diode OR (sometimes called Mickey Mouse logic) for ROMCS. (Preliminary schematic attached). Do look over the schematic carefully before you use the 1510 with non-TIMEX peripherals, as the decoding is not quite complete (i.e., there is nothing above 32K, right?). Also inside the 1510, mounted just under the front female edge connector, is a small strip of spring steel supported by a foam rubber pad. This little add-on greatly increases stability and virtually eliminates "RAM PACK Wobble" type problems for the 1510. The inside of the case is spray metallized to reduce RFI. Since the socket connector pins are only about 1/32" above that metal coating, I'm a little worried about pushing down too hard on a cartridge and causing a problem. But, as power is supposed to be off when you do this, it should not materialize for most.

A word of caution though, on the back (male) edge connector, the solution to "wobble" was apparently to make the slot extra tight. Mine was too tight, it pulled the key out of my RAMPACK, and broke some plastic out as well. I almost lost the RAM pack the next time I used it, as the key was missing.

Besides increased stability, the 1510 has two other features that may make it a good buy, for many, even without cartridges. These are: 1) A RESET switch. You can simply leave the 1510 hooked up all the time and obtain a warrantee saving, simple-to-use, RESET function. 2) Bus extension. Any number of peripherals have components sticking out which prevent direct mounting on the back of the TIMEX. Bus extenders cost from \$12 to \$20 and in many cases could be replaced by the 1510.

I had been using my 1510 as a RESET box only until I received my first software cartridge, PSION's FLIGHT SIMULATOR. I'm sure that program has been reviewed elsewhere so we'll cover just five points of using the cartridges.

The Timex cartridges come attractively packaged in a card box and are about 2 1/2" square and only 1/8" thick. They can only be inserted one way and take a considerable amount of force to insert. The gold edged contacts are protected while not inserted in the player by a self retracting plastic sleeve. Interestingly, instructions for the 1510 only were supplied with the cartridge. They indicate that it will come up running on that machine. On TS 1000's, you must execute a RND USR 8192 to a ML routine in the cartridge's EPROM. That, in turn, boots the ML and BASIC program up into the 16-32K area for execution. You can modify the program and even "SAVE" it then, from BASIC. Do note that you could disassemble TIMEX's transfer routine and use it with, say, a Hunter Board to produce your own "instant" software. However, only an 8K or less program (not including variables) can be stored and transferred.

The 1510 is a good value for the money (a 9 out of 10 on my scale) even as a stand alone peripheral and seems to be an excellent and economical way to use software. Let's hope Timex reproduces all their titles on cartridge.

BOMBING MISSION

YOU SIT tensely in the seat of your cockpit, staring anxiously through your viewfinder at the ground. Your mission is to find and destroy the enemy munitions dump as quickly as possible. Your finger stabs at the key with the downward arrow marked on it and the bomb is released. The game runs on the 1K ZX-81; as the aircraft crosses the sky you must release your bomb using the 6 key to bomb the target on the ground marked with a graphic A. The target will appear randomly on each run. Graphics notes:

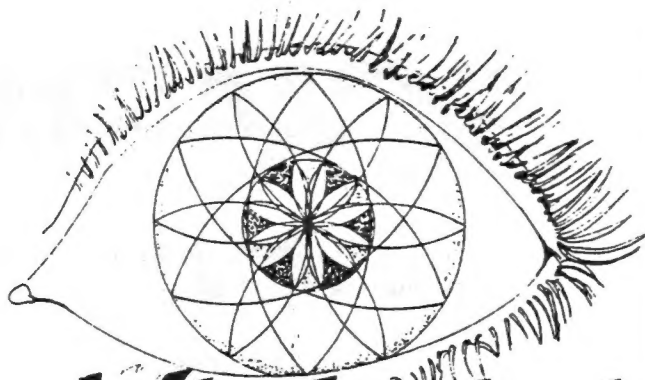
Line 30, graphic S.

Line 70, graphics T, Y, T, 6, 2 '—', inverse space, graphic 6, /, space, 21 graphic Ts, inverse space.

Line 120, graphic T, 6, T, 8, space, graphic T.

Line 210 graphics graphics Y, 8, space, graphic T.

```
10 LET A=SGN PI
20 LET S=A-A
30 LET G=CODE "GRAPHIC S"
40 LET F=INT (RND*(G+G))+CODE
"£"
50 LET Z=A-A
60 LET X=A
70 PRINT AT G,A-A;"TYT6- 6/ TT
TTTTTTTTTTTTTTTTTT "
80 PRINT AT G,F;CHR# G
90 PAUSE (G*G)
100 FOR B=A-A TO CODE "0"
120 PRINT AT A,B;CHR# (A-A);"T6
T8 T"
130 IF INKEY#="6" THEN LET Z=A
140 IF Z=A THEN LET X=X+A
150 IF Z=A THEN PRINT AT X,B+A;
"-"
160 IF X=G THEN LET Z=A-A
170 IF X=G AND B+A=F THEN GOTO
CODE "ABS"
180 NEXT B
190 LET S=S+A
200 GOTO CODE "W"
210 PRINT AT G-A,F-(A-A);"YBOOM
T";AT G-(A-A),F-A;"Y8 T";TAB G;S
;" BOMB"+(S AND S>A)
```



```

120 POKE 16418,0
130 PRINT AT 23,0;"TYPE C TO R
UN,Z TO COPY DESIGN"
140 IF INKEY$="" THEN GOTO 140
150 IF INKEY$="Z" THEN GOTO 180
160 IF INKEY$="C" THEN RUN
170 GOTO 140
180~PRINT AT 23,0;"(32 SPACES)"
190 COPY
200 GOTO 130

```

Kaleidoscope

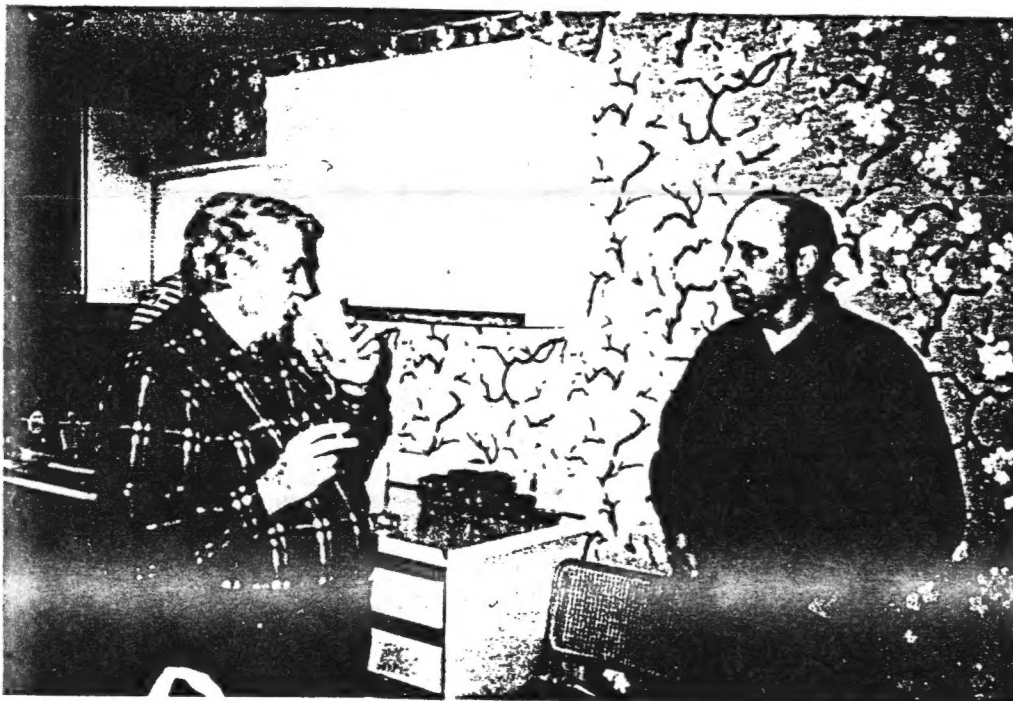
```

10 LET N=INT (RND*250)+200
20 FOR A=1 TO N
30 LET V=INT (RND*22)
40 LET H=INT (RND*32)
50 LET RV=21+(22-V)
60 LET RH=31+(32-H)
70 PLOT H,V
80 PLOT RH,V
90 PLOT RH,RV
100 PLOT H,RV
110 NEXT A

```

THE AUTHOR of Kaleidoscope, Matthew Calveley, of Lytham, Lancs, claims amazing results with this ZX-81 program. It will generate a random number of dots at random points on the bottom left of the screen and then re-create that pattern on the other quarters of the screen. All the patterns created will be symmetrical.

Kaleidoscope occupies 1.2K of memory but can be squeezed into 1K by removing lines 120 onwards, using VAL where numbers are used and by changing line 10 to:
10 LET N=INT (RND*25)+25.



List Scrapbook

Bob Mallory &
Tom Skapinski
Discuss a
TS 2068 Program
Before a Meeting

Came to the List
Meeting and be
Part of the action

F. Stearns